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ABSTRACT

Interactive video can be a very complex learning system, or it can be a simple tool for teachers to use to enhance their instruction. The term has been used broadly in the literature and includes three major aspects: (1) interactive video as storage; (2) interactive video as hardware; and (3) interactive video as learning concept. This digest describes each of these concepts in detail. The first section discusses the information storage and retrieval capacities of both Constant Angular Velocity (CAV) and Constant Linear Velocity (CLV) videodisks. A scheme for classifying interactive video hardware by "levels of intelligence" (based on a three-level scheme developed by the Nebraska Design/Production Group) is outlined in the second section. Emphasizing learner interaction with visuals, the third section focuses on the advantages of interactive video over other computer-based systems for instructional purposes. (10 references) (GL)

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INTERACTIVE VIDEODISC:

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by

Barbara L. Grabowski

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Interactive Videodisc: An Emerging Technology for Educators

by Barbara L. Grabowski

Students in English 10 have been directed to write an essay about the culture and major events during the time of John Steinbeck's classic *Grapes of Wrath*. They have also been given a computer-based interactive video system with which to search for relevant information. Controlled by a computer, a major database of textual information is available through CD-ROM and computer disc; in addition, a database of visual and audio information is accessible through a videodisc. During their eager search through the information, the students run into problems with one of the concepts and press "lesson" to be tutored on the topic. The tutorial uses both text and visuals to make important points. For a final small group exercise, the students engage in a life-like simulation to check their understanding of the issues of the day. The unit concludes when the teacher uses the interactive video system in front of the class to summarize features of the exercise. Video and text are at the teacher's fingertips with the simple press of a few buttons. Discussions are lively because the experience has enticed the students by immersing them in the sights and sounds of earlier times.

What Is Interactive Video?

As demonstrated in the above scenario, interactive video can be a very complex learning system, or it can be a simple tool for teachers to use to enhance their instruction. The term has been used broadly in the literature and includes three major aspects: 1) interactive video as storage, 2) interactive video as hardware, and 3) interactive video as learning concept. The purpose of this digest is to describe each of these concepts in detail.

Interactive Video As Storage Device

A videodisc storage unit is a 12- or 8-inch disc that looks like a large version of an audio compact disc. It is also read by a laser beam and, since no stylus ever touches the disc, it does not wear out and is not affected by fingerprints. This videodisc has two formats, each offering different capabilities: CAV (Constant Angular Velocity) and CLV (Constant Linear Velocity).

Each side of a 12-inch CAV disc can hold up to 54,000 slides, 30 minutes of motion video, or a combination of the two. In addition, there are two tracks that can store a total of 30 minutes of random access audio. An 8-inch disc can hold about half as much data. On a CAV disc, information is stored in tiny pits pressed in concentric rings on thin, shiny, reflective metal which is then sealed between protective layers of plastic. The rings each contain a "slide" and have their own "address." Information in each ring can be accessed in less than three seconds. Besides compact storage, a major advantage of interactive video is this rapid, precise access to any bit of information on the disc.

A CLV disc spins at a constant linear velocity, much like a long play record. Because of this, CLV discs can hold much more data than CAV discs: up to one hour of straight play motion video for a 12-inch disc and 20 minutes for an 8-inch disc. This format allows random access through time code rather than frame number. Because time access is not as precise as frame access, the major advantage of a CLV disc is its compact storage capability.

Interactive Video As Hardware

Interactive video hardware is needed to run a videodisc. The Nebraska Design/Production Group developed a widely adopted classification scheme which groups the hardware by "levels of intelligence" (Daynes & Butler, 1984). The higher the level, the greater the ability for internal computer control. Contrary to expectation, the more control the system has, the easier it is for the learner to operate and ignore the hardware.

Level 0. This describes a stand-alone videodisc player that is used for simple linear playback. Many movies are stored on CLV discs and are played in this fashion.

Level 1. A Level 1 player is also a stand-alone videodisc player, but it has additional built-in functions for rapid and precise frame searching, variable motion, mono or stereo audio control, stable freeze frames, and scanning. A Level 1 player allows the teacher to display any information in the visual and audio database to an entire class. A Level 1 player can also be used by students, individually or in small groups, with a keypad and printed directions.

Level 2. A Level 2 player has all the functions of a Level 1 player plus a built-in microprocessor and user-programmable memory. This type of player is most useful when programming is encoded right on the second audio track of the videodisc. Level 2 players allow more internal control through this programming on the disc. They are often seen in malls, information booths, or science displays where the customer is invited to press simple, one-key responses.

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While this system has its greatest use outside the classroom, it can be used by the teacher for individualized or small group enrichment exercises.

Level 3. A Level 3 player has all the capabilities of a Level 2 player and is connected to a microcomputer. Current combinations of videodisc players and computer systems offer a choice of one or two screens. In a two-screen system, one displays the video while the other displays the computer text. In a one-screen system, video and computer text are displayed on the same screen. A one-screen system, with an appropriate overlay board, displays computer images and videodisc images simultaneously. Often the hardware comes with a variety of components for interaction, such as a touch sensitive screen, mouse, or light pen. Because of the computer "command center," Level 3 interactive video offers the most flexibility for use as a large group, small group, or individual learning device.

Since the development of this classification scheme, some have defined another level. Level 4 has come to mean any Level 3 player with additional hardware such as a second (or third) videodisc player, a CD-ROM drive, or other electronic equipment.

Interactive Video As Learning Concept

Fleming and Levie (1978) classify the difference between instruction and learning according to the locus of the activity—instruction occurs outside the learner, but learning is something only the learner can do. As shown in the opening scenario, interactive video can be a true learning device since it is not something that is done to the learner but, rather, is an activity the learner does himself or herself.

Wittrock (1989) states that in order for learning to occur, learners must be, at a minimum, mentally active in the learning process. All computer-based instructional systems can mentally engage learners by directly involving them in learning. But because of the added dimension that video offers, interactive video surpasses other computer-based systems in its ability to involve the learner and engage him or her in a two-way dialog.

Well designed interactive video lessons invite learners to interact with the visuals by enabling them to interrupt, identify, sequence, and select from alternative actions. Students can interrupt visual scenes when they identify problems in the scenario. They can stop sequences if they can't follow the logic or get lost. They can practice with concepts by matching pictures to words, identifying critical visual elements of concepts, or matching sounds to words. For sequencing activities, learners can select appropriate psychomotor sequences or select options and be shown consequences visually and dramatically (Iuppa and Anderson, 1988).

Conclusion

Interactive video has been used in almost all content areas from literature to mathematics and science. The literature is full of case accounts of its effectiveness for a variety of uses. It must be remembered, however, that it is not the medium which makes interactive video effective, but the way in which it has been implemented.

Iuppa and Anderson (1988) state that interactive video is "more than a new trick, a new device or even a new technology" (p. 139). Interactive video as storage and hardware blends the elements once available only as separate media (Martorella, 1989). Interactive video as learning concept creates an environment where the two-way dialog essential for learning has become a reality. Because costs are falling and research has demonstrated the importance of interactivity, interactive video is destined to play an important role in the future of education and training.

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